

Vaccination of Persons with Primary and Secondary Immune Deficiencies

PRIMARY				
Category	Specific Immunodeficiency	Contraindicated Vaccines*	Recommended Vaccines	Effectiveness & Comments
B-lymphocyte (humoral)	Severe antibody deficiencies (e.g., X-linked agammaglobulinemia and common variable immunodeficiency)	OPV ¹ Smallpox LAIV BCG Ty21a (live typhoid)	Pneumococcal Influenza (TIV) Consider measles and varicella vaccination.	The effectiveness of any vaccine will be uncertain if it depends only on the humoral response; IGIV interferes with the immune response to measles vaccine and possibly varicella vaccine.
	Less severe antibody deficiencies (e.g., selective IgA deficiency and IgG subclass deficiency)	OPV ¹ Other live vaccines appear to be safe, but caution is urged.	Pneumococcal Influenza (TIV)	All vaccines probably effective. Immune response may be attenuated.
T-lymphocyte (cell-mediated and humoral)	Complete defects (e.g., severe combined immunodeficiency [SCID] disease, complete DiGeorge syndrome)	All live vaccines ^{2,3}	Pneumococcal Influenza (TIV)	Vaccines may be ineffective.
	Partial defects (e.g., most patients with DiGeorge syndrome, Wiskott-Aldrich syndrome, ataxia-telangiectasia)	All live vaccines ^{2,3}	Pneumococcal Meningococcal Hib (if not administered in infancy) Influenza (TIV)	Effectiveness of any vaccine depends on degree of immune suppression.
Complement	Deficiency of early components (C1, C2, C3, C4)	None	Pneumococcal Meningococcal Influenza (TIV)	All routine vaccines probably effective.
	Deficiency of late components (C5-C9) and C3, properdin, factor B.	None	Pneumococcal Meningococcal Influenza (TIV)	All routine vaccines probably effective.
Phagocytic function	Chronic granulomatous disease, leukocyte adhesion defect, and myeloperoxidase deficiency.	Live bacterial vaccines ²	Pneumococcal ⁴ Influenza (TIV) (to decrease secondary bacterial infection).	All inactivated vaccines safe and probably effective. Live viral vaccines probably safe and effective.

*Any vaccine that is not specifically contraindicated may be used if otherwise indicated.

¹ OPV is no longer recommended for routine use in the United States.

² Live bacterial vaccines: BCG, and Ty21a *Salmonella typhi* vaccine.

³ Live viral vaccines: MMR, OPV, LAIV, yellow fever, varicella, and vaccinia (smallpox). Smallpox vaccine is not recommended for children.

⁴ Pneumococcal vaccine is not indicated for children with chronic granulomatous disease.

Vaccination of Persons with Primary and Secondary Immune Deficiencies

SECONDARY			
Specific Immunodeficiency	Contraindicated Vaccines*	Recommended Vaccines	Effectiveness & Comments
HIV/AIDS	OPV ¹ Smallpox BCG LAIV Withhold MMR and varicella in severely immunocompromised children.	Influenza (TIV) Pneumococcal Consider Hib (if not administered in infancy) and Meningococcal vaccination.	MMR, varicella, and all inactivated vaccines, including inactivated influenza, may be effective. ⁴
Malignant neoplasm, transplantation, immunosuppressive or radiation therapy	Live viral and bacterial, depending on immune status. ^{2,3}	Influenza (TIV) Pneumococcal	Effectiveness of any vaccine depends on degree of immune suppression.
Asplenia	None	Pneumococcal Meningococcal Hib (if not administered in infancy)	All routine vaccines probably effective.
Chronic renal disease	LAIV	Pneumococcal Influenza (TIV)	All routine vaccines probably effective.

*Any vaccine that is not specifically contraindicated may be used if otherwise indicated.

¹ OPV is no longer recommended for routine use in the United States.

² Live bacterial vaccines: BCG and Ty21a *Salmonella typhi* vaccine.

³ Live viral vaccines: MMR, OPV, LAIV, yellow fever, varicella, and vaccinia (smallpox). Smallpox vaccine is not recommended for children.

⁴ HIV-infected children should receive IG after exposure to measles, and may receive varicella and measles vaccine if CD4+ lymphocyte count is $\geq 15\%$.

AIDS: Acquired Immunodeficiency Syndrome

BCG: Bacilli Calmette-Guerin vaccine

Hib: *Haemophilus influenzae* type b vaccine

HIV: Human Immunodeficiency Virus

IGIV: Immune Globulin Intravenous

IG: Immunoglobulin

LAIV: Live, Attenuated Influenza Vaccine

MMR: Measles, Mumps, Rubella vaccine

OPV: Oral Poliovirus Vaccine (live)

TIV: Trivalent (inactivated) Influenza Vaccine

Modified from American Academy of Pediatrics. Passive Immunization. In: Pickering LK, ed. *Red Book: 2003 Report of the Committee on Infectious Diseases*. 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003: [71-72] and Centers for Disease Control and Prevention. Recommendations of the Advisory Committee on Immunization Practices (ACIP): Use of Vaccines and Immune Globulins in Persons with Altered Immunocompetence. *MMWR* 1993; 42 (No. RR-4): [1-18].